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IS 13451 (1992): Urea molasses block as ruminant feed supplement [FAD 5: Livestock Feeds, Equipment and Systems]

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Indian Standard

UREA MOLASSES BLOCK AS RUMINANT FEED SUPPLEMENT — SPECIFICATION

UDC 636·087·23

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

July 1992 **Price Group 2**

Livestock Feeds Sectional Committee, FAD 5

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Livestock Feeds Sectional Committee had been approved by the Food and Agriculture Division Council.

Utilization of fibrous feeds by ruminant animals depends on the microbial activity in the rumen. Fibrous feeds are generally low in nitrogen, energy and minerals. As a result, ruminal microbial activity is poor, leading to poorer fermentation rate, coupled with lower microbial output.

Urea molasses (mineral) block lick, a cheap and safe source of nitrogen, energy and minerals, respectively, can supply the essential nutrients to the rumen microflora.

Feeding of urea molasses block as lick in the ration of lactating, growing and dry cattle and buffaloes, is both beneficial and economical as is evidenced by several farm and field trials.

This Indian Standard has been formulated to guide the manufacturers and users about the quality of urea molasses blocks.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

UREA MOLASSES BLOCK AS RUMINANT FEED SUPPLEMENT — SPECIFICATION

1 SCOPE

This Indian Standard prescribes the requirements and methods of sampling and test for urea molasses block feed supplement for cattle.

2 REFERENCES

The Indian Standards listed in Annex A are necessary adjuncts to this standard.

3 REQUIREMENTS

3.1 Description

The Urea Molasses Block (UMB) lick shall be in the form of a rectangular, solid block which shall be fed as a lick. The feed supplement shall be free from fermented odour, metallic pieces, toxic ingredients, adulterants, visible mould growth and insect infestation. It shall have characteristic molasses aroma.

3.2 Ingredients

3.2.1 The ingredients, which shall be used in the manufacture of urea molasses block are given in Annex B.

3.2.2 The recommended proportions of the ingredients in UMB is as follows:

Molasses	—	45 percent
Urea	—	15 percent
Mineral mixture	—	15 percent
Common salt	—	8 percent
Calcite powder	—	4 percent
Bentonite	—	3 percent
Protein meal (*see* Note)	—	10 percent

NOTE — Groundnut, soyabean, sesame, coconut, mustard and rapeseed oilcake (meal) may be used singly or in combination for urea molasses block production.

3.3 The UMB shall also conform to the requirements prescribed in Table 1.

3.4 The urea molasses block shall also contain the minerals and vitamins listed below in quantities not less than the values shown against each.

Mineral and Vitamins	*Amount/kg of Block on Dry Matter Basis (mg), Min*
Iron	400
Iodine	24
Copper	64
Manganese	96
Cobalt	14
Zinc	160
Vitamin A	10 000 I. U.

3.4.1 These requirements shall be declared by the manufacturer after periodic testing using test methods prescribed in **7**, **8**, **9**, **10**, **11** and **13** of IS 7874 (Part 2) : 1975 and Appendix B of IS 2052 : 1979.

3.5 Hardness

The urea molasses block shall satisfy any one of the following requirements given in **3.5.1**, **3.5.2** and **3.5.3**.

3.5.1 The urea molasses block shall be sufficiently hard on completion of the production process and shall not leave any impression on applying pressure.

3.5.2 The urea molasses block should have a compression strength of 4 000 kPa (4 kg/sq cm).

3.5.3 When the reaction is completed (using hot process), 0·2 to 0·3 g of the material shall be taken and shaped into a small ball in between the fingers On throwing with force on a pucca floor, this ball should bounce back to a height of 90 cm (30 feet).

4 PACKING AND MARKING

4.1 Packing

The urea molasses block shall be packed and heat sealed in sound, polythene bags of 300 gauge maximum. The blocks may be bulk packed in cardboard cartons.

4.2 Marking

Each bag shall be securely closed and suitably marked or labelled so as to give the following information:

a) Name of the material;
b) Name of the manufacturer;
c) Batch or code number;
d) Net mass of contents, when packed; and
e) Month and year of manufacture.

Table 1 Requirements for Urea Molasses Block

(*Clause* 3.3)

Sl No. (1)	Characteristic (2)	Requirement (3)	Methods of Test, Ref to (4)
i)	Moisture, percent by mass, *Max*	3·5	4 of IS 7874 (Part 1) : 1975
ii)	Crude protein (N × 6·25), percent by mass, *Min*	52·0	5 of IS 7874 (Part 1) : 1975
iii)	Crude fibre, percent by mass, *Max*	2·0	8 of IS 7874 (Part 1) : 1975
iv)	Total ash, percent by mass, *Min*	34·0	9 of IS 7874 (Part 1) : 1975
v)	Acid insoluble ash, percent by mass, *Max*	3·0	10 of IS 7874 (Part 1) : 1975
vi)	Calcium (as Ca), percent by mass, *Min*	4·0	IS 13433 (Part 1) : 1992*
vii)	Phosphorous (as P), percent by mass, *Min*	1·5	6 of IS 7874 (Part 2) : 1975
viii)	Sulphur, percent by mass, *Min*	1·0	Annex C
ix)	Urea, percent by mass, *Max*	15·0	IS 13399 : 1992

NOTE — The values specified for characteristics (ii) to (viii) are on moisture free basis.

*IS 13433 (Part 2) : 1992 shall be tested as a reference method.

4.2.1 Instructions for use shall be printed on the bag in English and a local language as given in Annex D.

4.2.2 Each bag may also be marked with the Standard Mark.

5 SAMPLING AND CRITERIA FOR CONFORMITY

Representative samples of the material shall be drawn and conformity of the material to the requirements of this specification shall be determined according to the methods prescribed in Appendix C of IS 2052 : 1979.

6 TESTS

6.1 Tests shall be carried out as prescribed in col 4 of Table 1, **3.4.1** and **3.5**, respectively.

6.2 Quality of Reagents

Unless specified otherwise, pure chemicals and distilled water (*see* IS 1070 : 1977) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

ANNEX A

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
246 : 1986	Specification for sodium thiosulphate, crystalline, photographic grade (*fourth revision*)
261 : 1982	Specification for copper sulphate (*second revision*)
262 : 1982	Specification for ferrous sulphate, heptahydrate (*second revision*)
920 : 1972	Specification for common salt for animal consumption including cattlelicks mineralized (*first revision*)
1162 : 1958	Specification for cane molasses
1374 : 1979	Specification for poultry feeds (*third revision*)
1664 : 1981	Specification for mineral mixtures for supplementing cattle feeds (*second revision*)
1713 : 1981	Specification for decorticated groundnut oilcake as livestock feed ingredient
1781 : 1975	Specification for urea, technical (*first revision*)
1932 : 1986	Specification for mustard and rape seed oilcake as livestock feed ingredient (*second revision*)

IS No.	*Title*
1934 : 1961	Specification for sesamum oilcake as livestock feed ingredient (*second revision*)
2052 : 1979	Specification for compounded feeds for cattle (*third revision*)
2154 : 1986	Specification for coconut oilcake as livestock feed ingredient (*second revision*)
3441 : 1986	Specification for solvent extracted groundnut oilcake (meal) as livestock feed ingredient (*first revision*)
6186 : 1986	Specification for bentonite (*second revision*)
7874	Methods of tests for animal feeds and feeding stuffs :
(Part 1) : 1975	Part 1 General methods
(Part 2) : 1975	Part 2 Mineral and trace elements
8249 : 1976	Specification for zinc sulphate, agricultural grade
10535 : 1983	Specification for manganese sulphate, monohydrate
10657 : 1983	Solvent extracted soyabean oilcake (meal) as livestock feed ingredient
13057 : 1991	Specification for potassium iodate
13399 : 1992	Method of test for animal feeds and feeding stuffs — Determination of urea
13433	Method of test for animal feeds and feeding stuffs — Determination of calcium :
(Part 1) : 1992	Part 1 Titrimetric method
(Part 2) : 1992	Part 2 Atomic absorption spectrometric method

ANNEX B

(*Clause* 3.2.1)

INGREDIENTS FOR UREA MOLASSES BLOCKS

1. Molasses (*see* IS 1162 : 1958)
2. Urea (*see* IS 1781 : 1975)
3. Mineral mixture (*see* IS 1664 : 1981)
4. Salt (*see* IS 920 : 1972)
5. Calcite powder
6. Oil cakes/meals
    - a) Decorticated groundnut oilcake (*see* IS 1713 : 1970) and solvent extracted groundnut oilcake (meal) (*see* IS 3441 : 1966)
    - b) Solvent extracted soyabean oilcake (meal) (*see* IS 10657 : 1983)
    - c) Sesame oilcake (*see* IS 1934 : 1961)
    - d) Coconut oilcake (*see* IS 2154 : 1986) and solvent extracted coconut oilcake (meal) (*see* IS 3591 : 1985)
    - e) Mustard and rapeseed oilcake (*see* IS 1932 : 1986)
7. Bentonite (*see* IS 6186 : 1986)
8. Trace minerals
    - a) Ferrous sulphate (*see* IS 262 : 1982)
    - b) Copper sulphate (*sse* IS 261 : 1982)
    - c) Zinc sulphate (*see* IS 8249 : 1976)
    - d) Cobalt chloride
    - e) Manganese sulphate (*see* IS 10535 : 1983)
    - f) Potassium iodate (*see* IS 13057 : 1991)
    - g) Sodium thiosulphate (*see* IS 246 : 1986)
9. Vitamin A and D_3.

ANNEX C

[*Table* 1, *Sl No.* (viii)]

DETERMINATION OF SULPHUR

C-0 PRINCIPLE

Sulphur in the sample is oxidized to magnesium sulphate when heated with magnesium oxide or nitrate. Sulphur from magnesium sulphate is precipitated as barium sulphate after adding barium chloride to the hot solution in the acidic conditions.

C-1 APPARATUS

C-1.1 Crucible

C-1.2 Muffle Furnace

C-2 REAGENTS

C-2.1 Magnesinm Oxide

C-2.2 Magnesium Nitrate

C-2.3 Sucrose Powder

C-2.4 Nitric Acid

C-2.5 Hydrochloric Acid — (1 + 2·5) (*v/v*).

C-2.6 Barium Chloride — 10 percent (*m/v*).

C-3 PROCEDURE

C-3.1 Weigh accurately 3·0 g of magnesium oxide or equivalent quantity of magnesium nitrate (19·2 g), 1 g sucrose and 50 ml of nitric acid in a large crucible. Add 2-3 g of the urea molasses block.

C-3.2 Evaporate on steam bath to paste.

C-3.3 Place the crucible in an electric muffle furnace and gradually heat furnace up to 550 ± 10°C until all nitric oxide fumes are driven off and all organic matter is destroyed.

C-3.4 Cool, dissolve, and neutralize with hydrochloric acid (1 + 2·5) and add 5 ml excess.

C-3.5 Filter through Whatman filter paper No. 40. Heat the filtrate to boiling and and add 5 to 10 ml of 10 percent barium chloride solution, dropwise.

C-3.6 Evaporate to approximately 100 ml, let stand overnight, filter and wash with hot water.

C-3.7 Ignite the material along with the filter paper in muffle at 550 ± 10°C for 30 minutes.

C-3.8 After cooling weigh the barium sulphate precipitate.

C-3.9 Carry out a blank determination simultaneously using the same quantities of the reagents.

C-4 CALCULATION

$$\text{Sulphur, percent by mass} = \frac{13{\cdot}74 \times (M_1 - M_2)}{M}$$

where

M_1 = mass, in g, of the barium suphate precipitate obtained from the material;

M_2 = mass, in g, of the barium sulphate precipitate obtained from the blank; and

M = mass, in g, of the material taken for the test.

ANNEX D

(*Clause* 4.2.1)

INSTRUCTION FOR USE OF UREA MOLASSES BLOCK AS RUMINANT FEED SUPPLEMENT

1. The wrapper of block should be removed before it is kept in front of the animal for licking.
2. A block should be in front of the animal so that it can lick as and when it desires.
3. A fresh block should be kept on the previous one when it becomes too small to lick.
4. A separate block should be kept for individual animals.
5. Enough straw/dry fodder should be offered when block is fed.
6. A block should not be removed once the animal starts licking.
7. Care should be taken that no water falls on block. Animals should not be allowed to drink block rinsed water.
8. Block should not be ground and mixed with any other feed.
9. Block should not be offered to calves below 3 months of age.
10. Care should be taken that block is not soiled with dust, dung or urine.
11. Care should be taken that urea is being fed from one source only.
12. Animal should have access to clear drinking water *ad Libidum.*
13. A dispenser/holder should be used to avoid soiling.
14. The block should be used within six months of the date of manufacture.

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BUREAU OF INDIAN STANDARDS

Headquarters :

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones : 331 01 31, 331 13 75

Telegrams : Manaksanstha
(Common to all offices)

Regional Offices :

Central :	Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	331 01 31 331 13 75
Eastern :	1/14 C. I. T. Scheme VII M, V. I. P. Road, Maniktola CALCUTTA 700054	87 86 62
Northern :	SCO 445-446, Sector 35-C, CHANDIGARH 160036	53 38 43
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